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MODEL 3600

SERVICE MANUAL

MARANTZ CO., INC. · P.O. BOX 99 · SUN VALLEY, CALIFORNIA · 91352
A WHOLLY OWNED SUBSIDIARY OF SUPERSCOPE INC., SUN VALLEY, CALIFORNIA 91352

PERFORMANCE SPECIFICATIONS

OUTPUT LEVEL	
Preamp Output	3.0 V RMS (Rated Output)
Phono Ampl at Scope Output	3.0 V RMS (Rated Output)
GAIN	
Phono at 1 kHz/Mic to Preamp Output	60 dB
Phono at 1 kHz/Mic to Recording Output	40 dB
High Level to Preamp Output	20 dB
INPUT IMPEDANCE	
Phono	47 KOhms
Mic	47 KOhms
High Level	25 KOhms
INPUT SENSITIVITY	
Phono at 1 kHz/Mic	1 mV to equal 1 Volt at Preamp Output
High Level	100 mV to equal 1 Volt at Preamp Output
FREQUENCY RESPONSE	
Phono	± 0.5 dB max var fr RIAA std
High Level	± 0.25 dB 20 Hz to 20 kHz
TOTAL HARMONIC DISTORTION	
Phono	Less than 0.025% 20 Hz to 20 kHz at Tape Output, at Rated Output
High Level	Less than 0.025% 20 Hz to 20 kHz at Preamp Output, at Rated Output
INTERMODULATION DISTORTION	
Phono	Less than 0.012% (Rated Output)
High Level	Less than 0.01% (Rated Output)
CHANNEL SEPARATION (20 Hz -20kHz FILTER)	More than 40 dB All modes of operation, Unused inputs shorted, 20Hz to 20 kHz
HUM AND NOISE	
Phono/Mic	Less than 0.78 microvolt Max Equivalent Input, Input Shorted
High Level	Less than 100 dB below Rated Output, Input Termn 600 ohms
VOLUME TRACKING (1 kHz Ref)	± 1.5 dB to -40dB attenuation ± 2.0 dB to -50dB attenuation
OPERATING POWER REQUIREMENTS	
Voltage Range	100 to 130 V AC
Nominal Voltage	120V AC
Power	6W
Frequency	60 Hz
Fuse	0.5 A

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INTRODUCTION

This manual was prepared for service personnel in factory-authorized warranty repair stations and other equally-qualified and equipped service centers. The service information contained herein is applicable to the Model 3600 Stereo Control Console, a stereo preamplifier manufactured by the Marantz Company, Inc., a subsidiary of Superscope Incorporated, Sun Valley, California 91352.

Performance evaluation tests and service of the Model 3600 should be undertaken only by the experienced technician, one knowledgeable in solid-state preamplifier operation and the use of sensitive test equipment. All instructions should be read carefully and understood fully before proceeding with any service or repair. To better understand the functions of this preamplifier refer to the Simplified Block Diagram, Figure 1, the Schematic Diagram, Figure 2, the Wiring Diagram, Figure 3, and the paragraphs under Description and Operation.

As the Marantz Company learns of service and repair difficulties, supplementary Technical Services Bulletins will be sent to all service and repair facilities. To improve this service continually, all service and repair problems should be communicated to the Technical Services Manager at our corporate headquarters.

DESCRIPTION AND OPERATION

This section is included to assist the service technician in understanding the operation of the Model 3600 Stereo Control Console. The technical data describe the basic operating principles of the Model 3600. The following circuit descriptions will be based on the left channel only as the right channel operates identically.

A. PHONO/MIC AMPLIFIER

High- or low- level inputs selected by the Program Selector Pushswitches are applied in accordance with signal level. When low-level inputs are selected (Phono or Mic), the Program Selector Pushswitch applies the signal to the Phono/Mic Amplifier and selects the proper equalization (RIAA or Mic). The equalized signal is then returned to the Program Selector Pushswitches where it is handled as another high-level input.

High-level input signals (Tuner, Aux, Tape 1, Tape 2, Dubbing In, or the equalized output of the Phono/Mic Amplifier) are applied simultaneously to the Tape Monitor Switch, The Tape Outputs, Dubbing Out Jack, and Scope Outputs. The Tape Monitor Switch selects between the signal at the Program Selector Pushswitches (Source) and the input at either Tape 1 or Tape 2. The signal selected by the Tape Monitor Switch is then applied to the Mode Switch.

The Mode Switch determines the manner in which subsequent circuits process left- and right-channel input signals. These include left channel only, right channel only, two-channel stereo, stereo reverse, or left and right channels combined (L+R). The signal or combination of signals selected by the Mode Switch is then applied to the Balance Control. The Balance Control adjusts the relative signal level of the left and right channels by attenuating the level of one channel while maintaining the level of the other.

From the Balance Control, the signal is applied to the Volume Control, which varies the signal level available at the preamplifier outputs. The signal is also applied to the Loudness Contour Circuit which, when activated, boosts low and high frequencies at low listening levels so that all frequencies appear to have equal loudness. The signal from the Volume Control is applied to the input of the Times-Ten (X10) Amplifier.

B. TIMES TEN (X10) AMPLIFIER

The X10 Amplifier increases the signal level to that required to drive power amplifiers. The output of the X10 Amplifier is applied to an Active Filter Network comprised of three filter circuits (30 Hz, 5 kHz, and 9 KHz) and a Filter Amplifier stage. The Active Filter Network sharply reduces low- and/or high-frequency noise that may originate at the program source. The output of the filter amplifier is applied to the Tone Control/Turnover Network comprised of the Bass, Mid, and Treble Tone-Control circuits, the 250 Hz and 4 KHz Turnover circuits, and a Tone Amplifier stage. The output of the Filter Amplifier is also applied to the Tone Switch.

C. TONE CONTROL/TURNOVER NETWORK

The Tone Control/Turnover Network performs a dual function. The tone control portion of the network boosts or attenuates low, middle, and high frequencies. The turnover portion of the network decreases (in frequency) the low/middle-frequency locus (turnover) point at which the bass control becomes effective and/or increases (in frequency) the middle/high-frequency turnover point at which the treble control becomes effective. The Tone Switch selects either the flat output of the Filter Amplifier (bypassing the tone controls) or the tone-control-altered output of the Tone Amplifier. From the Tone Switch, the signal is applied to the Time Delay Relay.

D. TIME DELAY RELAY

The circuit associated with the Time Delay Relay causes the relay contacts to remain open for approximately five seconds after power is applied. During the five-second interval, the power supply circuits stabilize and the relay contacts close. Audible "pops" from power supply transients are hereby eliminated.

From the contacts of the Time Delay Relay, the signal is applied to the preamplifier outputs to drive an external power amplifier. The power amplifier outputs are applied to the Speaker Switching Inputs and the signal is applied to the stereo Phono jack. The power amplifier signal is also applied to the Main and/or Remote Speaker terminals by the corresponding Speaker switch.

TESTS AND ADJUSTMENTS

A. TEST EQUIPMENT

Tests and adjustments in the following paragraphs are based on the use of the Recommended Test Equipment listed in Table 1 or their equivalent. A.C. Power Control Box and Test Equipment Connection Diagrams are shown in Figures 4 and 5 respectively.

B. PRELIMINARY PROCEDURE

1. Set controls on A.C. Power Control Box as follows:

   Line Switch ..... OFF
   Phase Switch ..... NORMAL
   Wattmeter Switch ..... IN
   Autotransformer .. Minimum (Full CCW)

2. Set Model 3600 controls to the "Normal" condition (any variation of these settings in this section will be so noted):

   Program Selector ..... Tuner
   Mode ..... Stereo
   Volume ..... Minimum (Full CCW)
   Balance ..... Mid
   Tone Switch ..... Out
   Tape Monitor ..... Source
   Turnover Switches ..... Out
   Filter Switches ..... Out
   Loudness Switch ..... Out
   Tone Switch ..... Out
   Tone Controls ..... Mid

3. Install shorting plugs in Aux Input jacks.

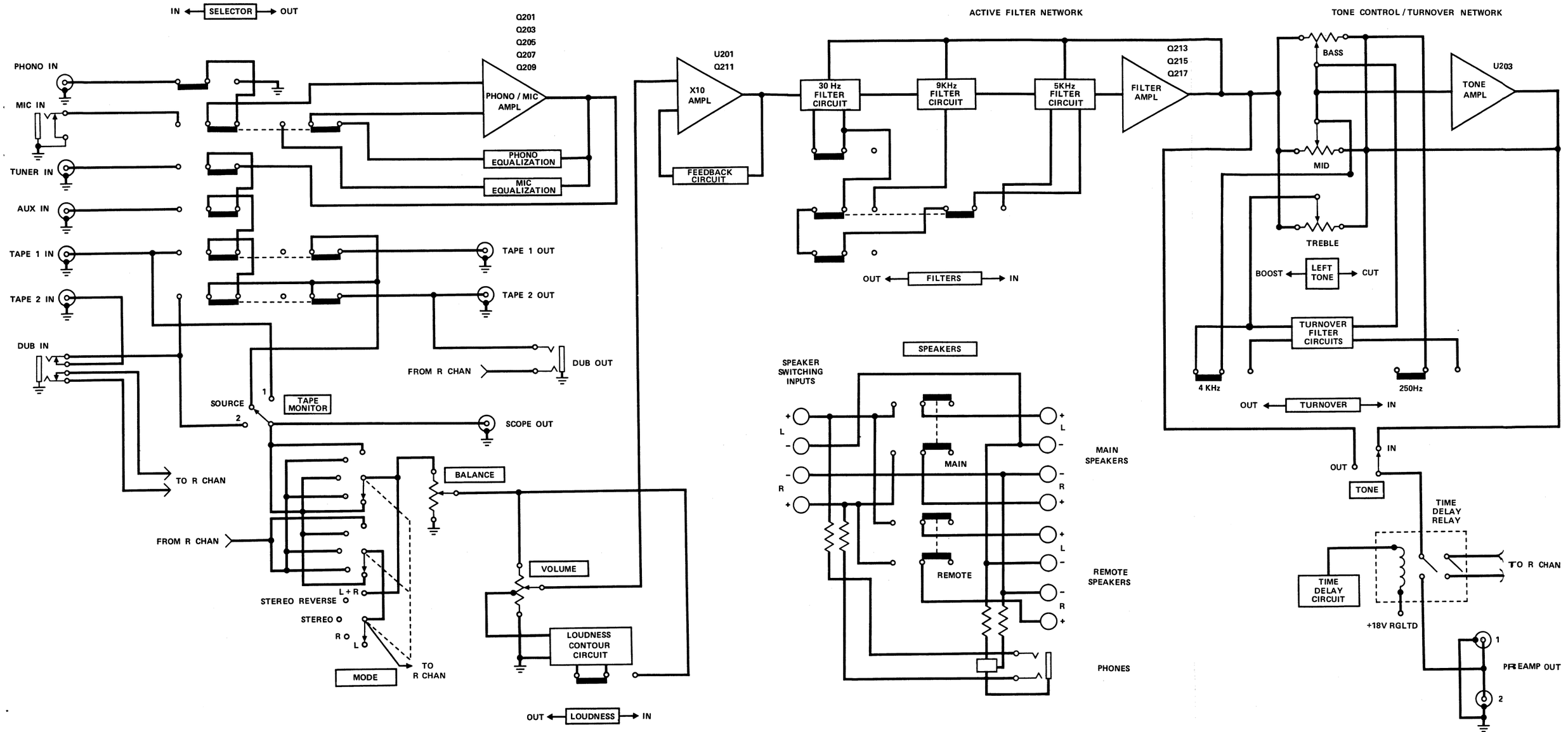
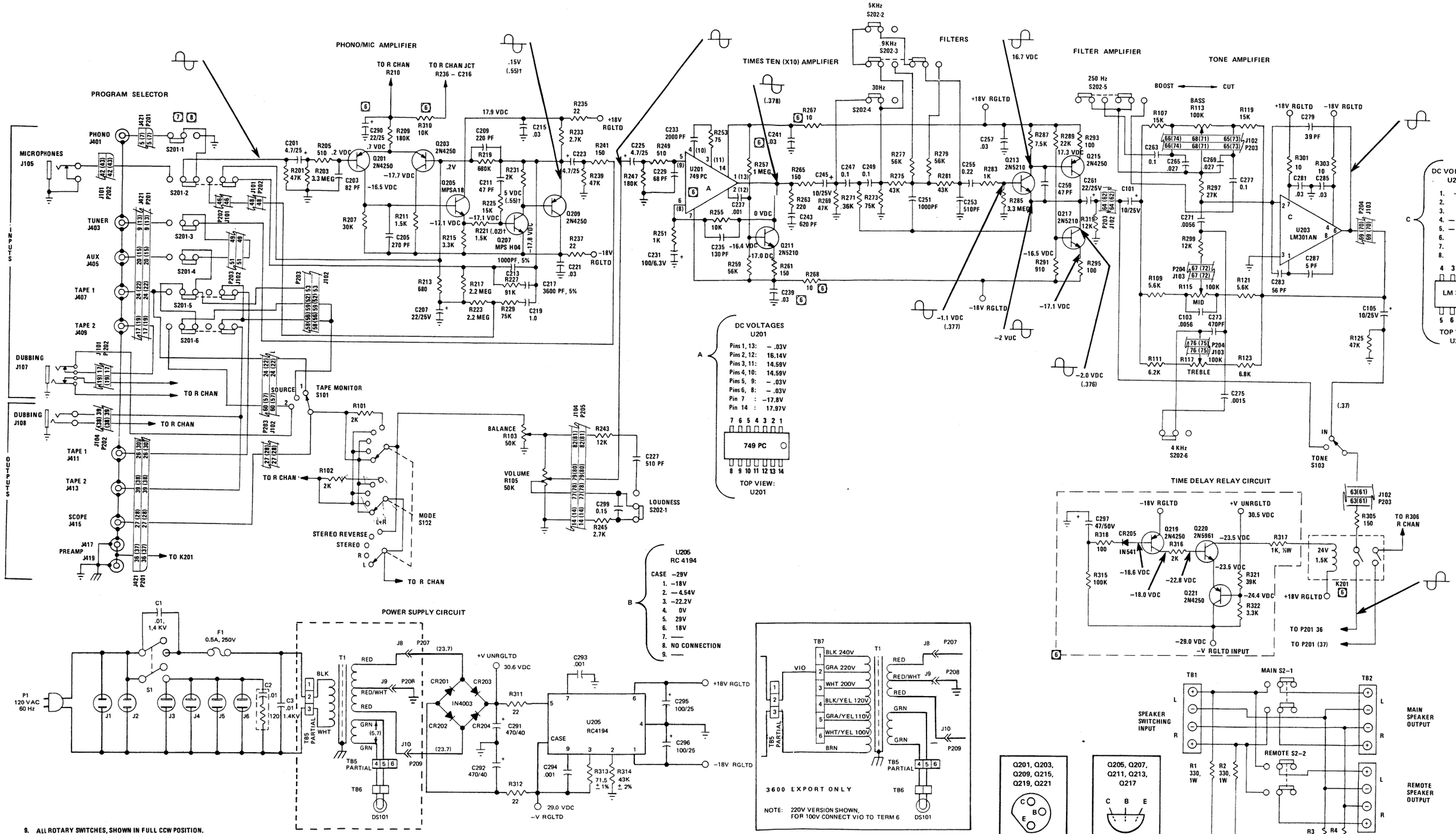


Figure 1. Functional BlockD iagram



9. ALL ROTARY SWITCHES, SHOWN IN FULL CCW POSITION.
6. SWITCHES S201-1 THRU S201-6 ARE INTERLOCKING.
7. ALL SWITCHES EXCEPT PHONO ARE SHOWN IN NORMALLY OUT POSITION.
6. COMPONENT OR CIRCUIT COMMON TO BOTH CHANNELS.
5. LEFT CHANNEL REFERENCE DESIGNATIONS ARE ODD NUMBERS, RIGHT CHANNEL REFERENCE DESIGNATIONS ARE NEXT HIGHER EVEN NUMBERS.
4. NUMBERS IN PARENTHESIS ARE FOR RIGHT CHANNEL.
3. THIS SCHEMATIC SHOWS LEFT CHANNEL ONLY.
2. CAPACITORS IN MFD, 10%. POLARIZED CAPACITORS ARE ELECTROLYTICS, (+100%, −20%).
1. RESISTORS IN OHMS, 1/4W, 5%.

NOTES, UNLESS SPECIFIED:

7. ( )† INDICATES AC VOLTAGES EXPRESSED IN RMS WITH A SIGNAL GENERATOR ADJUSTED TO DEVELOP 1kHz @ −40dB LEVEL AND APPLIED TO THE PHONO INPUT. SIGNAL GENERATOR USED: SOUND TECHNOLOGY 1700A.
6. ( ) INDICATES AN AC VOLTAGE EXPRESSED IN RMS WITH A SIGNAL GENERATOR ADJUSTED TO DEVELOP 1kHz @ 0dB LEVEL AND APPLIED TO THE AUX INPUT. SIGNAL GENERATOR USED: SOUND TECHNOLOGY 1700A.
5. ALL DC VOLTAGES MEASURED WITH NO SIGNAL APPLIED, INPUT JACK SHORTED.
4. ALL VOLTAGES MEASURED WITH CONTROLS IN THE MID-RANGE POSITION, TONE SWITCH ON.
3. ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS GROUND.
2. ALL VOLTAGES MEASURED WHILE MAINTAINING CONSTANT 120 VOLT LINE INPUT THROUGH AN AUTOTRANSFORMER.
1. ALL INDICATED VOLTAGES ARE WITHIN ±10% TOLERANCE.

NOTES: VOLTAGES UNLESS SPECIFIED:

Figure 2. Schematic Diagram

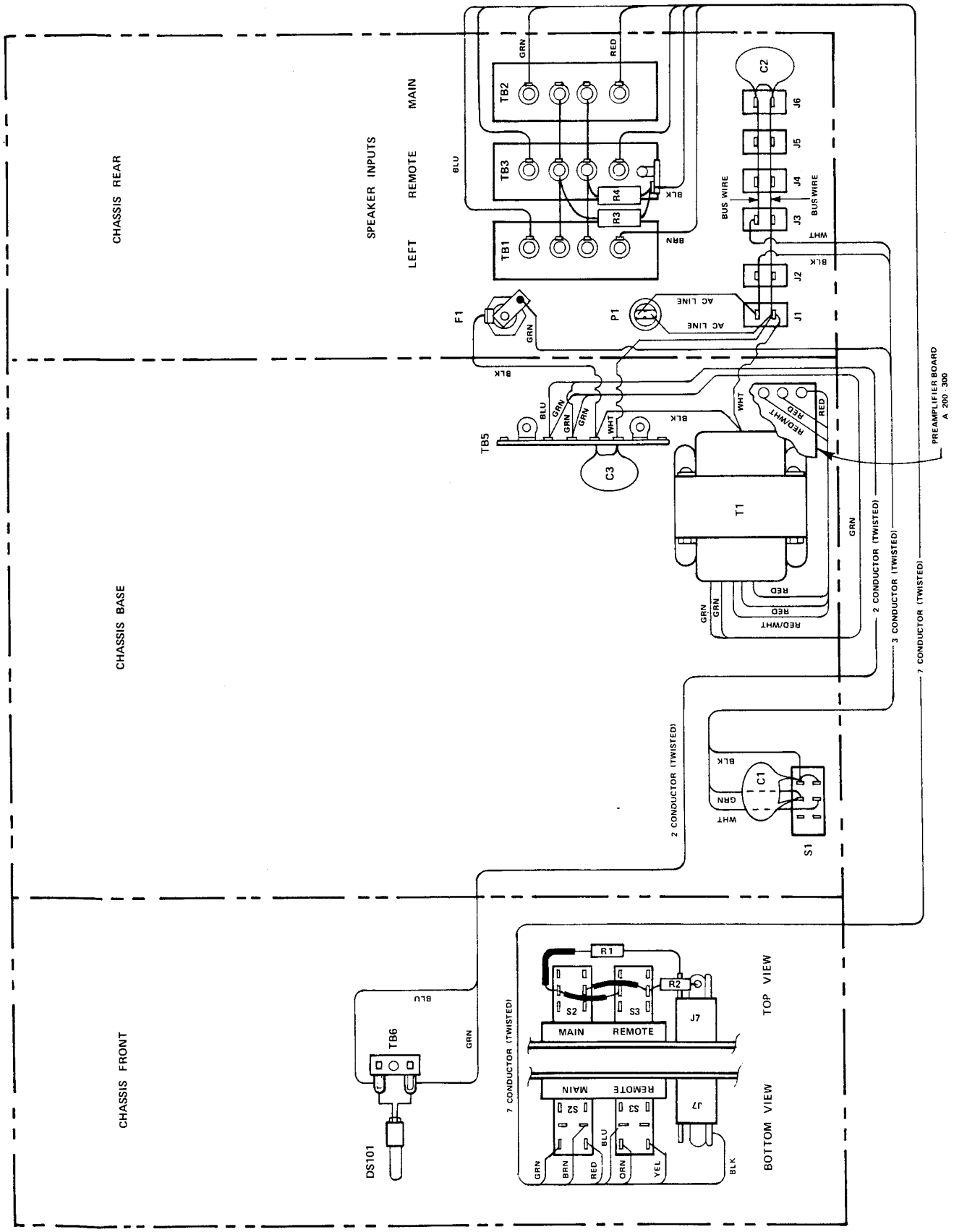
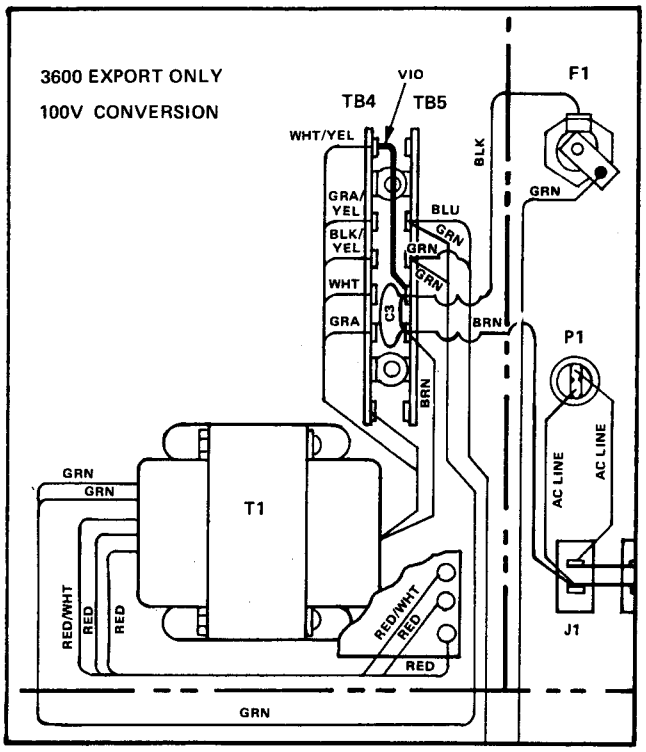


Figure 3A. Wiring Diagram



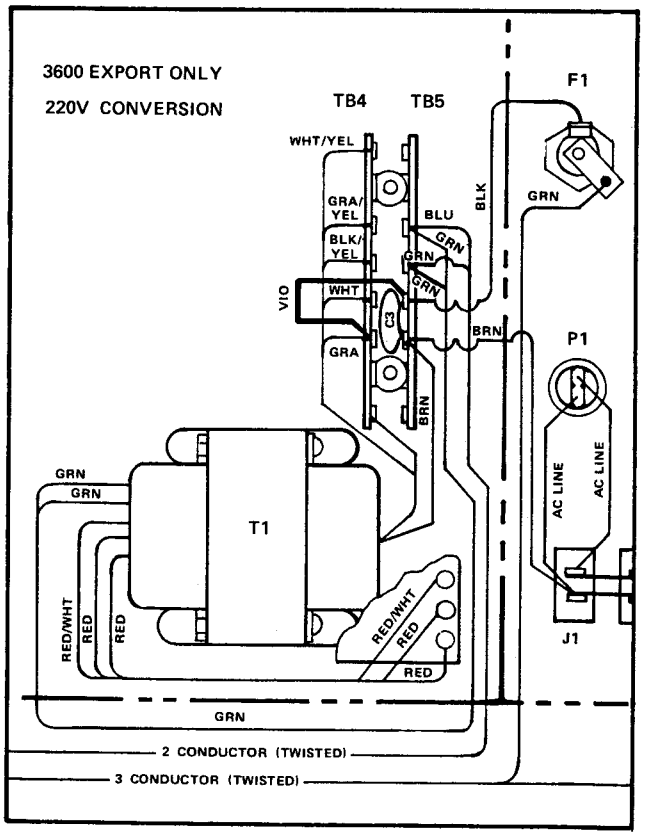


Figure 3B. Wiring Diagram (cont'd)

EQUIPMENT ITEM	MANUFACTURER AND MODEL NO. OR EQUIVALENT	USE
Distortion Analyzer (capable of measuring 0.02% THD)	Sound Technology Model 1700A or Hewlett Packard Model 331A or 333A	Measure total harmonic distortion of preamp
AC Voltmeter (capable of measuring 30 mV (noise) accurately)	Hewlett Packard Model 400F	Measure preamp output voltage
Audio Oscillator residual distortion less than 0.02%	Sound Technology Model 1700A or Weston Model CVO-100P	Audio signal source
Oscilloscope	Tektronix Model 503; Data Model 555	Waveform analysis and trouble-shooting
VTVM	RCA Senior Volt-Ohm-yst Model 555; Simpson 312	Voltage and resistance measurements
Variable Autotransformer (0-140 V AC)	Powerstat Model 116B	Controls A.C. line voltage to preamp
AC Wattmeter 0-150 W	Simpson Model 1379 (Catalog No. 10970)	Monitor preamp power consumption
Line Voltmeter 0-150 V AC	Simpson Model 1359 (Catalog No. 10320)	Monitor A.C. line voltage to preamp
AC Power Control Box (optional)	Fabricated in accordance with Figure 4.	Monitor line voltage and power consumption
Phono Shorting Plug (4)	Phono shorting plug with 600 ohm resistor across center pin and shell	Short preamp input to eliminate noise pickup
Noise Filter (20 Hz to 20 KHz, 12 dB per octave roll off, less than 3 microvolts residual noise input)	Commercial grade.	Measure noise.

Table 1. Recommended Test Equipment

C. POWER CONSUMPTION VERIFICATION

1. Plug Model 3600 AC Plug into AC Control Box outlet.

2. Set LINE Switch (AC Power Control Box) to VARIABLE.

3. Observing Wattmeter, slowly rotate autotransformer control CW to 120 VAC. If Wattmeter indicates more than 7 W at any time, (or fails to indicate at all), shut off AC power and refer to the Trouble Analysis section.

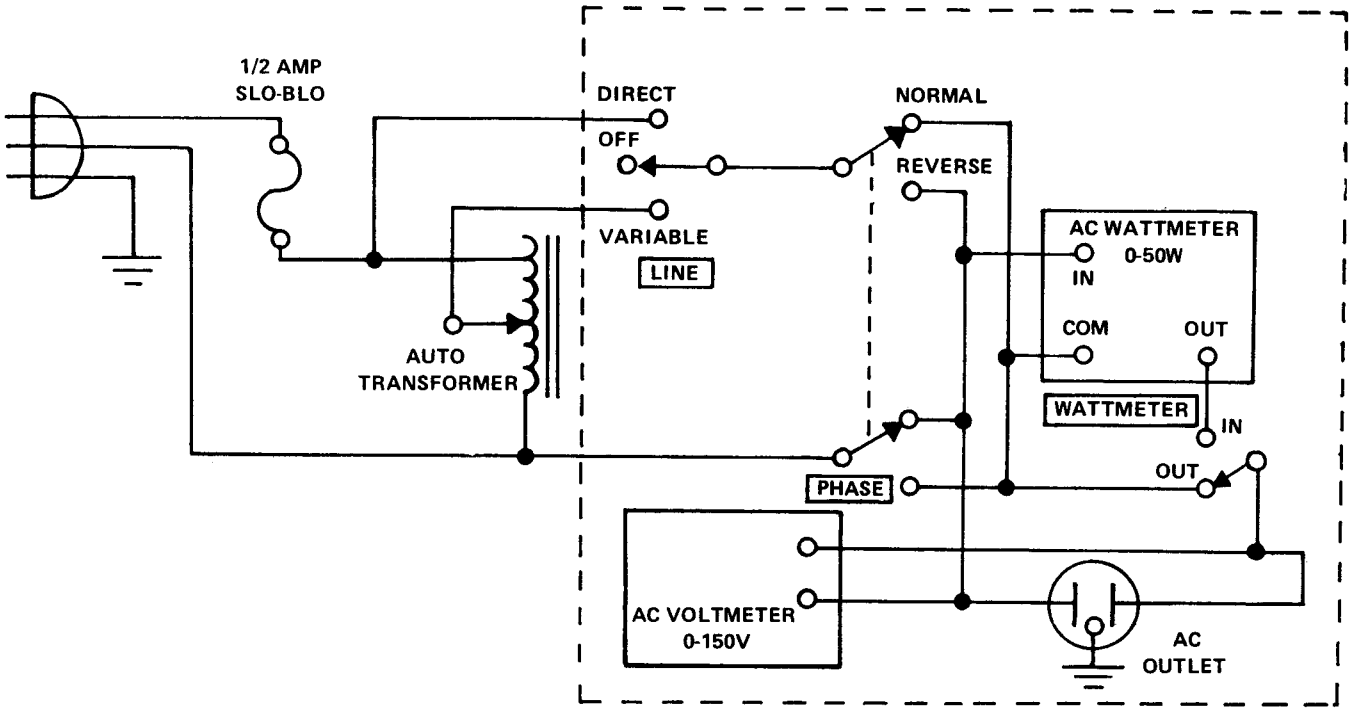


Figure 4. AC Power Control Box Connection Diagram

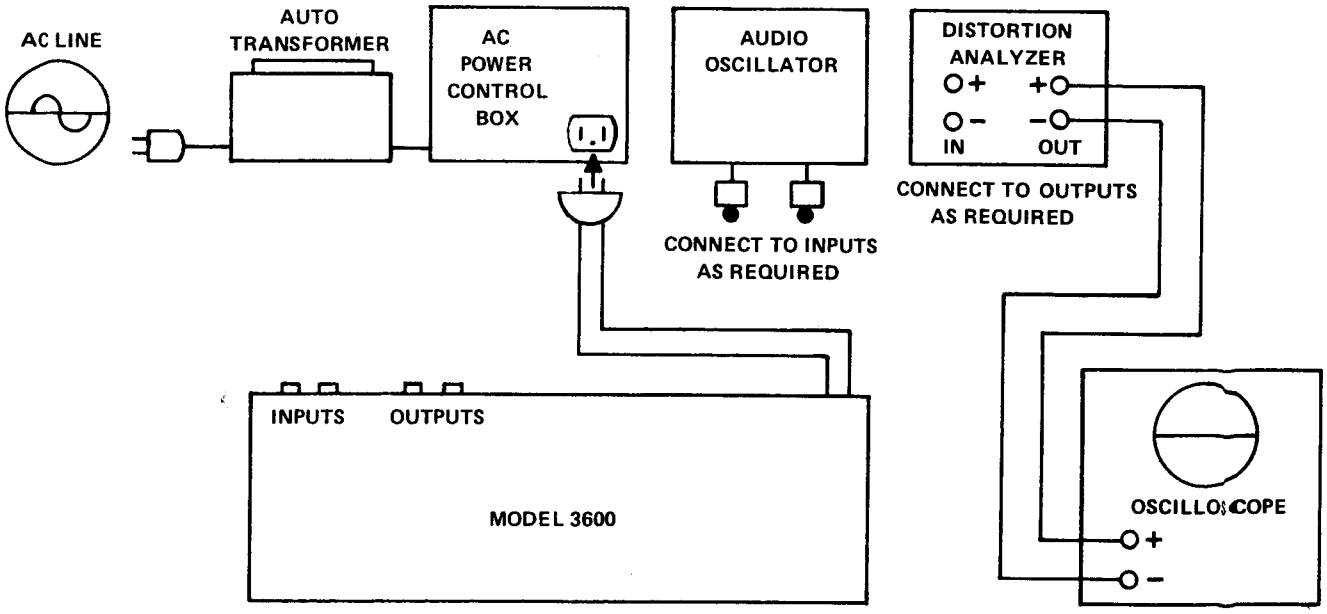


Figure 5. Test Equipment Connection Diagram

D. FUNCTIONAL TESTS

Perform functional tests on unit to establish the operation of all inputs, outputs and controls as specified. Reset Model 3600 controls to their "Normal" positions upon completion of the functional test.

1. For low level (Phono or Mic) input tests, apply a 1 kHz, 10 mV audio signal to Phono Input. Depress PHONO Selector Pushswitch.
2. Set Distortion Analyzer controls for AC VTVM and monitor output at SCOPE or TAPE OUTPUT Jack. Output should be approximately 1.0 V rms.
3. Without changing generator output level, disconnect and reconnect to Mic Input. Depress MIC Selector Pushswitch. Output should remain at approximately 1.0 V rms.
4. For high level (Tuner, Aux, or Tape) inputs, turn preamp power off, set generator to 1 kHz, 300 mV rms output. Connect to TUNER Input. Reconnect Distortion Analyzer to PREAMP Output.
5. Turn preamp power on, set VOLUME to maximum, depress TUNER Selector Pushswitch. Output should be approximately 3.0 V rms.
6. Without changing any connections other than inputs, check AUX, TAPE 1, and TAPE 2 Inputs as described in Step 5. Output level should remain at approximately 3.0 V rms.

E. MAXIMUM VOLTAGE OUTPUT

1. Depress AUX Selector pushswitch. Connect generator to AUX Input. Monitor signal at PREAMP OUTPUT with oscilloscope and distortion analyzer controls set for AC VTVM. Set VOLUME to MAX.
2. Set generator frequency to 1 kHz and increase generator output to the point of just below clipping. VTVM should indicate at least 9.0 V rms.

F. TOTAL HARMONIC DISTORTION (THD)

1. With preamp VOLUME set to maximum, check THD of AUX Input at 20 Hz, 2 kHz, and 20 kHz (3.0 V rms output). THD should be less than 0.025 percent.
2. Change input to PHONO and depress PHONO Selector pushswitch. Adjust generator for 3.0 V rms at TAPE OUTPUT. Check THD at 20 Hz, 2 kHz, and 20 kHz. THD should be less than 0.025 percent.

G. HUM AND NOISE

1. Insert 600-ohm phono shorting plug into each PHONO and AUX INPUT jack. Switch in bandpass filter control.
2. Turn VOLUME control CW up to maximum and depress PHONO Selector pushswitch. Noise output should indicate less than 78 microvolts at TAPE OUTPUT.
3. Depress AUX Selector pushswitch. Noise output should indicate less than 30 microvolts at PREAMP OUTPUT.

H. FREQUENCY RESPONSE (PHONO/MIC)

Refer to Figure 6. RIAA Equalization Curve and Standards to verify unit conformance.

1. For Phono frequency response apply a 1 kHz signal to PHONO INPUT. Connect AC VTVM to PREAMP OUTPUT. Set generator output for 0 dB indication on VTVM.
2. Check output level at the following frequencies ± 0.5 dB:

20 Hz	− 19.30 dB
100 Hz	+ 13.11 dB
400 Hz	+ 3.81 dB
2 kHz	− 2.61 dB
10 kHz	− 13.75 dB
20 kHz	− 19.60 dB

3. For Mic frequency response apply a 1 kHz signal to MIC INPUT. Depress MIC Selector pushswitch. Set generator output to 0 dB as measured at PREAMP OUTPUT.
4. Reduce generator frequency to 30 Hz. Output should be 0 dB (± 0.75 dB).
5. Increase generator frequency to 11.5 kHz. Output should be 0 dB (+ 0 dB, − 4 dB).

J. HIGH LEVEL SEPARATION

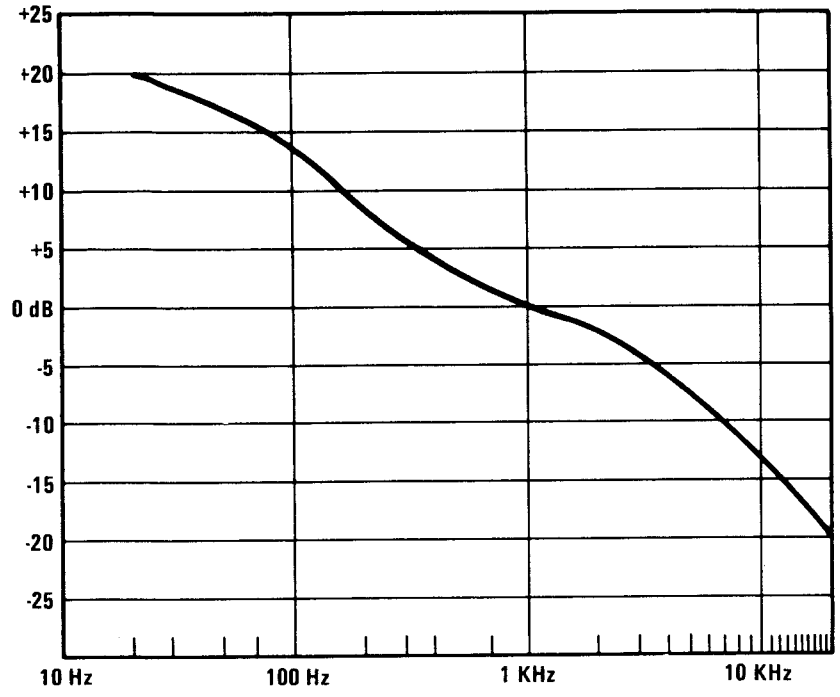
1. Connect generator to left channel AUX INPUT. Insert a 600-ohm phono shorting plug into right channel AUX INPUT. Monitor signal at PREAMP OUTPUT with AC VTVM.
2. Set generator frequency at 20 Hz. Set generator level for 0 dB, 3 V rms output as indicated on the VTVM.
3. Observe the output of the undriven channel on the VTVM. Output should be at least 40 dB below the 0 dB reference level indicating a 40 - dB left - to - right channel separation. Repeat test on right channel.

K. FILTERS (Figure 7.)

1. Connect generator to AUX INPUT. Depress AUX Selector pushswitch. Connect AC VTVM to PREAMP OUTPUT.
2. To establish a reference level, set generator frequency to 1 kHz, 0 dB as measured on the VTVM.
3. Depress 9 kHz FILTER Switch. With oscillator switched to 9 kHz input, output level should drop 3.0 dB (± 1.25dB). Depress and release FILTER switch.
4. Depress 5 kHz FILTER Switch. With oscillator switched to 5 kHz, output should drop 3 dB (± 1.25dB). Depress and release FILTER Switch.
5. Depress 30 Hz FILTER Switch. With oscillator switch to 30 Hz, signal should drop 3 dB (± 0.75 dB). Depress and release FILTER Switch.

L. TONE CONTROL (Figure 8.)

1. Connect generator to AUX INPUT. Depress AUX Selector pushswitch. TONE Control should be set to OUT. Connect AC VTVM to PREAMP OUTPUT.
2. With VOLUME Control set to maximum, set generator output level for 0 dB, 3 V rms indication on VTVM.
3. Set TONE switch to IN and center TONE controls. Output should remain 0 dB.
4. Sweep from 20 Hz to 20 kHz. Frequency response should be flat (± 0.25 dB) at all audio frequencies.
5. Set generator to 100 Hz. Slide BASS Tone Control up to maximum boost position. Output level should increase 10 dB (± 2 dB) as measured on VTVM. Slide BASS Control down to maximum cut position. Output should decrease to 10 dB (± 2 dB) below 0 dB reference level. Center BASS Control.
6. Set generator to 1 kHz. Slide MID Control up to maximum boost and observe for an increase of 8.5 (± 2 dB). Slide MID Control down to maximum cut and observe for a decrease of 8.5 dB (± 2 dB) below 0 dB reference level. Center MID Control.
7. Set generator to 10 kHz. Slide TREBLE Control up to maximum boost. Output should increase 10 dB (± 2 dB). Slide control down to maximum cut and observe for a 10 dB ± 2 dB decrease below 0 dB reference level. Center TREBLE Control.



RIAA NAB DISK REPRODUCING STD.

20 KHz	−19.60 dB
15 KHz	−17.17 dB
14 KHz	−16.64 dB
13 KHz	−15.95 dB
12 KHz	−15.28 dB
11 KHz	−14.55 dB
10 KHz	−13.75 dB
9 KHz	−12.88 dB
8 KHz	−11.91 dB
7 KHz	−10.85 dB
6 KHz	− 9.62 dB
5 KHz	− 8.23 dB
4 KHz	− 6.64 dB
3 KHz	− 4.76 dB
2 KHz	− 2.61 dB
1000	0
700	+ 1.23 dB
400	+ 3.81 dB
300	+ 5.53 dB
200	+ 8.22 dB
100	+13.11 dB
70	+15.31 dB
50	+16.96 dB
30	+18.61 dB
20 Hz	+19.30 dB

Figure 6. RIAA Equalization

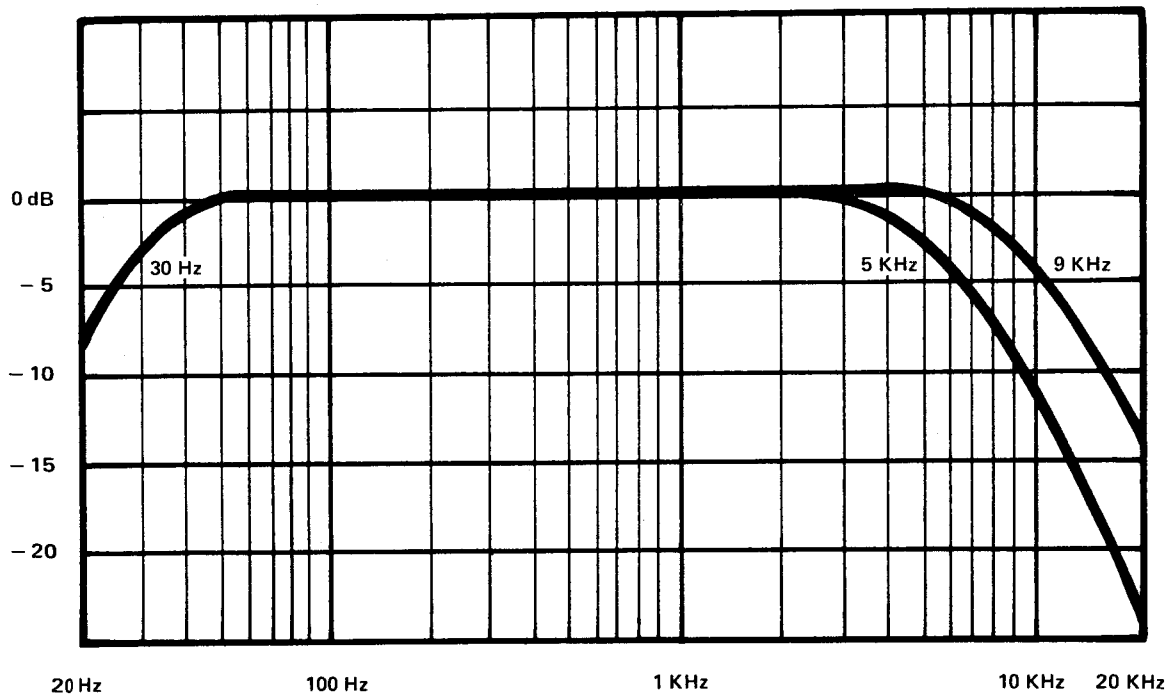


Figure 7. Active Filter Network Characteristics

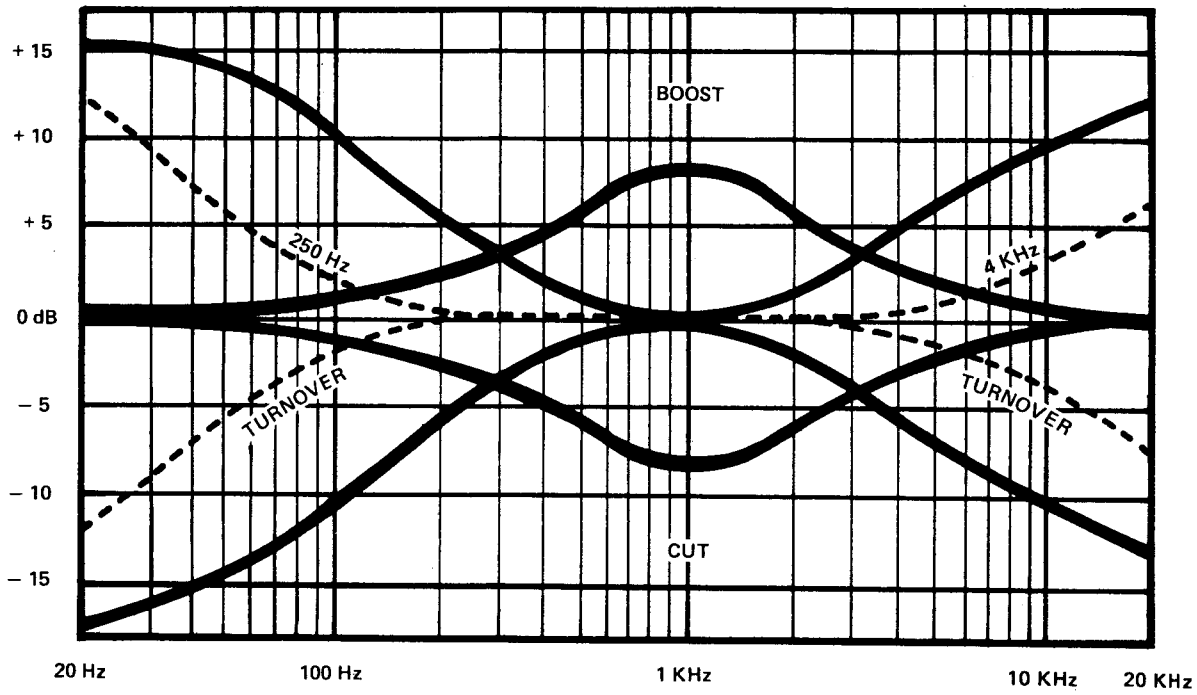


Figure 8. Tone Control/Turnover Network Characteristics

M. TURNOVER FREQUENCIES (Figure 8.)

1. Set generator frequency to 50 Hz. Depress 250 Hz TURNOVER pushswitch.
2. Slide BASS Control up to maximum boost. Output signal level should increase 6 dB ± 1 dB. Slide BASS Control down to maximum cut. Output signal level should decrease 6 dB ± 1 dB. Center BASS Control. Depress and release 250 Hz TURNOVER pushswitch.
3. Set generator frequency to 17 kHz. Depress 4 kHz TURNOVER pushswitch.
4. Slide TREBLE Control up to maximum boost. Output signal level should increase 6 dB ± 1 dB. Slide TREBLE Control down to maximum cut. Output signal level should decrease 6 dB ± 1 dB. Center TREBLE Control. Depress and release 4 kHz TURNOVER pushswitch.
5. Set TONE control to OUT.

N. VOLUME TRACKING

1. Connect generator to AUX INPUT. Depress AUX Selector pushswitch. Rotate VOLUME Control CW to maximum. Monitor signal at PREAMP OUTPUT with AC VTVM.
2. Set generator frequency to 1 kHz. Set generator output for a 0 dB output level at VTVM.
3. Reduce volume in 5 dB increments while monitoring both outputs of the preamp. Right and left channel output levels should be within ± 3 dB of each other down to – 40 dB. Output levels should be within ± 4 dB of each other from – 40 dB to – 50 dB.

P. LOUDNESS CONTOUR

1. Connect generator to AUX INPUT. Depress AUX Selector pushswitch. Monitor output at PREAMP OUTPUT with AC VTVM.
2. Set generator frequency to 100 Hz, 10 dB at PREAMP OUTPUT.
3. Reduce generator output to –30 dB at the VTVM.
4. Depress LOUDNESS pushswitch. Signal level should increase 6 dB (± 1 dB).
5. Repeat test with generator frequency set to 10 kHz. Output signal level should increase 4.5 dB (± 1.5dB).

TROUBLE ANALYSIS

This section is included to assist in locating troubles that may be difficult to isolate. Normal troubleshooting techniques (point-to-point signal tracing and oscilloscope analysis) are assumed in isolating problems.

NOTE: Performance verification is necessary following any repair.

Table 2. lists possible symptoms and causes if a Model 3600 malfunctions. We do not attempt to point up all potential problems and their remedies since the service technician is capable of recognizing most. We attempt to aid the service technician in isolating problems from the unit level down to a detail part.

All references in this section will be made to Figures 1, 2, and 3.

SYMPTOMS	PROBABLE CAUSE
No primary power consumption	1. Open A.C. input circuit, line cord, fuse, power switch or transformer 2. Power supply circuit defective.
Excessive primary power consumption	1. Short in A.C. input circuit 2. Short in A.C. secondary circuit, pilot lamp circuit, or power supply.
No signal output both channels	No D.C. supply voltage to amplifiers, +Vcc, −Vcc or neither, caused by broken supply lines, defective power supply lines or defective power transformer.
No signal output in any condition	1. Short in input circuit 2. Open input circuit, Program Selector, Tape Monitor, Mode, Volume or Balance Switch 3. Defective X10 amplifier and/or filter amplifier 4. Output circuit open or shorted.
No signal output in low level inputs	1. Shorted input circuit to phono amplifier 2. Open input circuit 3. Defective phono amplifier 4. Phono amplifier output circuit open 5. Short in phono amplifier output circuit 6. Phono amplifier oscillating (VHF) because of open (or shorted) feedback circuit through Program Selector Switch.
No signal output with TONE in or LOUDNESS in	1. Defective tone amplifier 2. Open tone amplifier output circuit 3. Defective Tone or Loudness switch.
Low gain in low level inputs	Defective phono amplifier.
Low gain with TONE in	Defective tone amplifier.
High distortion in any condition	1. X10 amplifier defective 2. Excessive output loading 3. Filter amplifier defective.

Table 2. Trouble Analysis

SYMPTOMS	PROBABLE CAUSE
High distortion in low level inputs	1. Defective phono amplifier 2. Hum pickup in the input circuit.
High distortion with TONE in	Defective tone amplifier.
Excessive noise in low level inputs	1. Defective phono amplifier 2. Open feedback circuit, Program Selector switch 3. Input circuit open 4. Input cable shield not grounded.
Excessive noise in high level inputs	1. Defective X10 amplifier 2. Input circuit cable shield not grounded 3. Excessive power supply ripple (hum).
Excessive noise with TONE in	Defective tone amplifier.
Oscillation in low level inputs	1. Open input circuit 2. Open feedback circuit, program selector switch 3. Grounds intermittent or broken 4. Defective phono amplifier.
Oscillation in high level inputs	1. Defective X10 amplifier 2. Shorts in high or low filter circuits.

Table 2. Trouble Analysis (continued)

REPACKING FOR SHIPMENT

Should the unit require repacking for shipment, observe the following precautions:

A. Do not ship the unit with the walnut cabinet installed; remove the unit from the cabinet before packing.

B. Pack the unit carefully, using the original material as shown in Figure 9.

NOTE: If the packing material was lost, discarded, or damaged, new packing material may be obtained by writing to the Marantz Technical Services Department. The carton, its fillers, and packing instructions will be returned to you at a nominal charge.

C. Ship by a reputable carrier (do not use Parcel Post) and obtain a shipping receipt from the carrier.

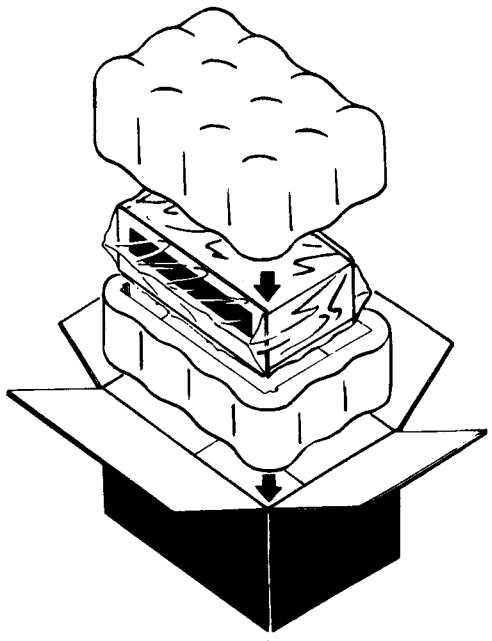


Figure 9. Repacking Illustration

D. Insure the unit for its full value.

E. Be sure to include your return address on the shipping label.

PARTS LIST

The following illustrated parts list is supplied for parts location and identification. Parts listed are referenced on Figures 2 and 3, and shown on Figures 10 through 14. Parts are listed alphabetically by reference designations from major assemblies down to detail parts within those assemblies. Part numbers with fewer than ten digits require zeros to complete.

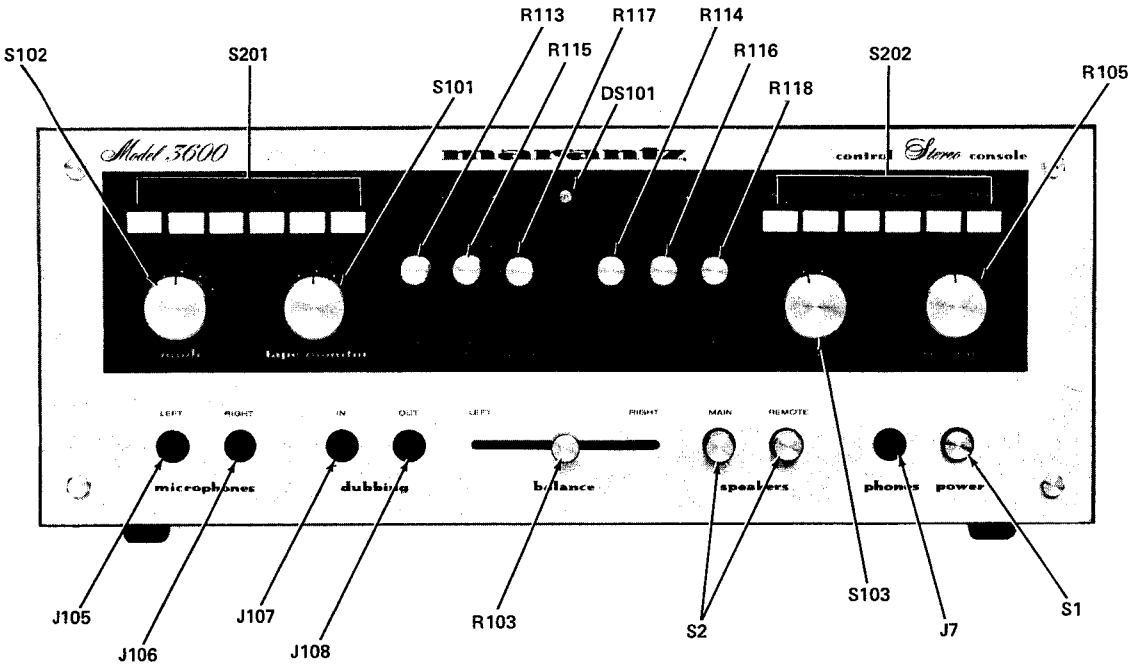


Figure 10. Front Panel

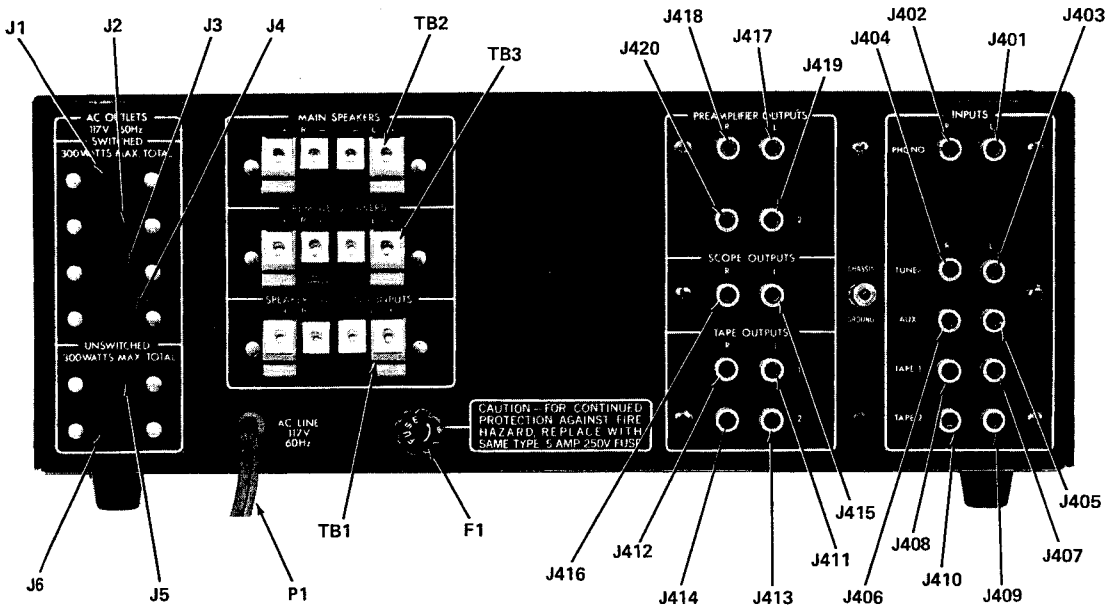


Figure 11. Rear Panel

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE	
	210-2000-1	**PREAMPLIFIER UNIT**	
	136-2001	COVER, UNIT	
	206-2000-1	FRONT DRESS PANEL ASSY (INCLUDES)	
		INSULATOR, UNIT COVER	
		PANEL, FRONT DRESS	
		SHIELD, DRESS PANEL	
		MASK, DUST, TONE CONTROL	
		MASK, DUST, BALANCE CONTROL	
		WINDOW, DRESS	
		JEWEL, PILOT LIGHT	
	174-2001	KNOB, ROUND, FUNCTION	x4
	180-1092	LABEL, UL APPROVED	
	180-2000-1	LABEL, SERIAL NUMBER (SERIALIZED)	
	551-2000	BUSHING, ROUND	x3
	551-2001	BUSHING, PHONE JACK	x5
	551-2002	BUSHING, BALANCE CONTROL	
	551-2003	BUSHING, TONE CONTROL	x6
	578-2000	FRAME, DRESS PANEL	
	578-2001	BEZEL, 6-STATION SWITCH	
	580-2009	KNOB, ROUND, TONE/ BALANCE CONTROL	x7
	580-2003	KNOB, ROUND, POWER	
	580-2004	KNOB, RECTANGULAR	x12
	580-2005	KNOB, ROUND, SPEAKER	x2
	585-1008	LABEL, CAUTION	
	769-2010	DRESS BOLT, HEX HD.	x4
	775-3242	SETSCREW, 8-32 x 1/4, BLK CP	x4
	784-4112	SCREW, 6-32 x 1/4, TF, CRSHD, BLK	x20
	820-9900	SHIELD, LAMP	
A1	**210-2001-1**	**CHASSIS ASSEMBLY**	
	133-2000	CHASSIS, FRONT	
	133-2001	CHASSIS, BASE	
	133-2002	CHASSIS, REAR, MARKED	

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE	
	202-2000-1	PILOT LIGHT SHIELD ASSY	
	210-2002-1	REAR CHASSIS ASSEMBLY	
C1, C3	383-1006	CAPACITOR, .01 MFD, 1400V	
C2	389-2000	CAPRISTOR, .1 MFD, 120 OHMS, 500V	
F1	451-1016	FUSE, 0.5 A, 250V	
J1-J6	360-1034	OUTLET, AC	
J7	360-1005	PHONE JACK, DOUBLE OPEN CIRCUIT	
J8, J9, J10	365-1015	CONNECTOR, FEMALE	
R1, R2	423-3332	RESISTOR, C-C, 330 OHMS ± 5%, 1W	
R3, R4	436-1103	RESISTOR, WW, 1 OHM ± 10%, 2W	
S1	452-2015	SWITCH, POWER	
S2	452-2000	SWITCH, 2-STATION, SPEAKER	
T1	440-2001	TRANSFORMER, POWER	
TB1 thru TB3	362-2000	TERMINAL BLOCK	
TB4	362-2005	TERMINAL STRIP	
TB5	362-2006	TERMINAL STRIP	
TB6	362-2002	TERMINAL STRIP	
	127-2001	INSULATOR, PILOT LIGHT ASSEMBLY	
	132-2002	BRACKET, POWER SWITCH	
	136-2005	SHIELD, PILOT LIGHT	
	168-2000	STANDOFF, HEX	x2
	168-2001	SPACER	x4
	359-2004	STANDOFF, HEX, 5-32 x 1/2, 2-56 THD	x2
	359-2012	BINDING POST	

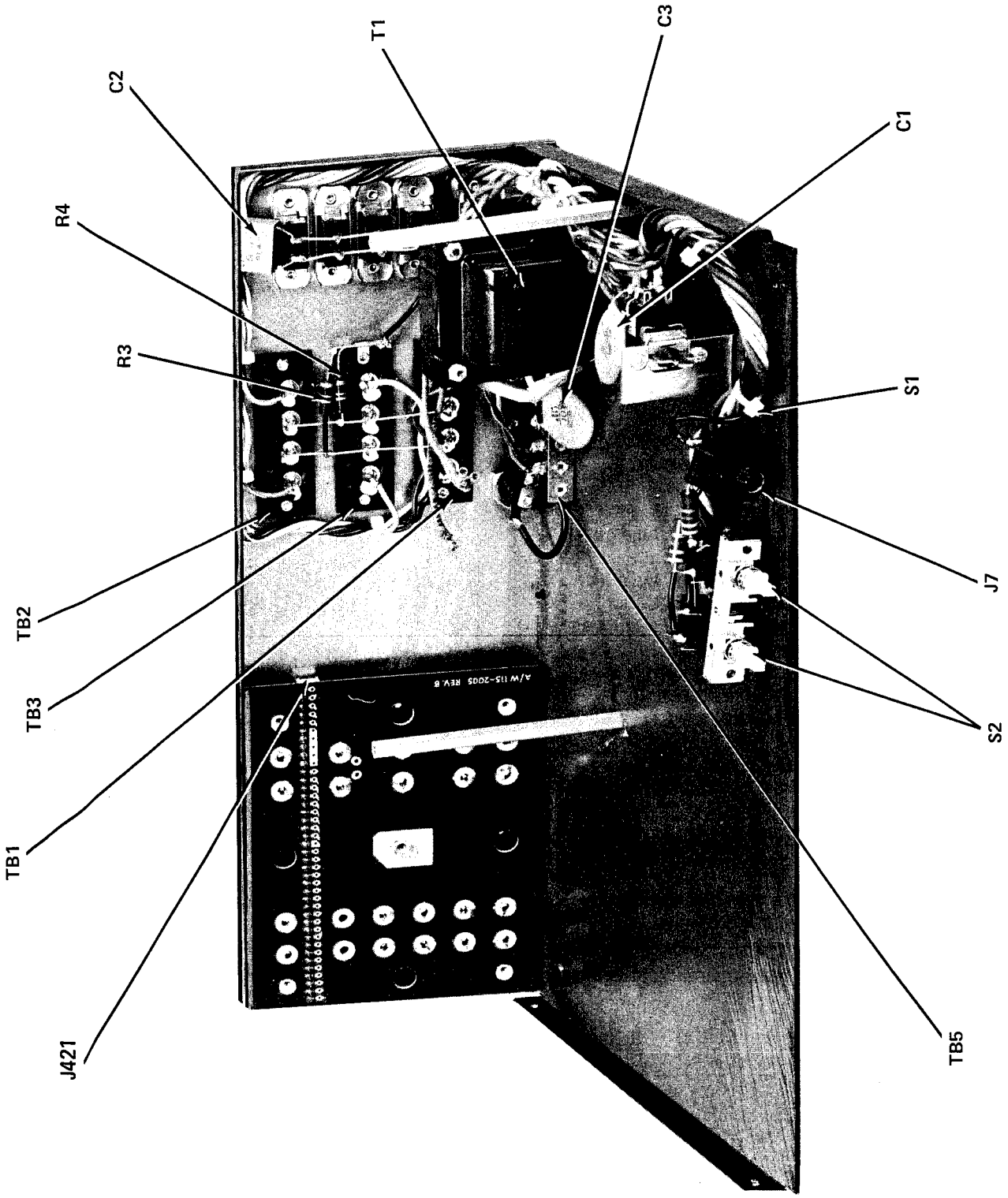


Figure 12. A1 Chassis

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
	361-1001	LINE CORD, AC
	367-1000	FUSE HOLDER, W/MTG. HDW
	565-1001	BUSHING, STRAIN RLF
	567-2000	FOOT, PLASTIC, BLK, W/FELT PAD x4
	670-4552	WASHER, FLAT NO. 6, BLK WAX x4
	671-2232	LOCKWASHER, NO. 4, SPT, BLK
	671-4330	LOCKWASHER, NO. 6, SPT, CD x2
	671-4332	LOCKWASHER, NO. 6, SPT, BLK, WAX x6
	672-5510	LOCKWASHER NO. 8 INTL T x2
	672-8816	LOCKWASHER, INTL T x4
	675-1015	FLATWASHER
	680-8726	NUT, HEX, 3/8-32 x 1/2 x4
	682-2000	SPEED NUT, J-TYPE x4
	689-1023	NUT, HEX, 3/8-32 x5
	689-2000	SPEED NUT, NO. 6, J-TYPE x4
	741-0410	SCREW, 6-32 x 1/4 L, PNH CRSHD, STL, CD x2
	741-0412	SCREW, 6-32 x 1/4 L, PNH, CRSHD, STL, BLK, WAX x2
	741-0612	SCREW, 6-32 x 3/8 PNH, CRSHD, STL, BLK, WAX x4
	769-2002	SCREW, 3MM x 35MM L, PNH, CRSHD, STL, BLK x4
	741-0612	SCREW, 6-32 x 3/8 L, PNH CRSHD, BLK, WAX x4
	799-1011	SCREW, NO. 6-20 x 1/2 L, SH MET TYPE Z, STL, BLK, WAX x4
A100	**200-2000-1**	**CONTROL BOARD COMPONENT ASSEMBLY**
C101, C102	* 381-2002	CAPACITOR, 10MFD +100%, -20%, 25V
C103, C104	386-2000	CAPACITOR, 5600PF ± 10%, 100V
C105, C106	381-2002	CAPACITOR, 10MFD +100%, -20%, 25V
DS-101	482-2000	LAMP, PILOT LIGHT
J101	360-2000	CONNECTOR, 11-PIN
J102 (PARTIAL)	360-1020	CONNECTOR, 13-PIN
J102 (PARTIAL)	360-1019	CONNECTOR, 16-PIN
J103	360-2001	CONNECTOR, 8-PIN
J104	360-2003	CONNECTOR, 7-PIN
J105, J106	360-1017	PHONE JACK, SINGLE CLOSED CIRCUIT, MIC
J107	360-1004	PHONE JACK, DOUBLE CLOSED CIRCUIT, DUB IN
J108	360-1005	PHONE JACK, DOUBLE OPEN CIRCUIT, DUB OUT
		RESISTORS ARE OHMS ± 5%, 1/4 W UNLESS OTHERWISE SPECIFIED
R101, R102	434-4202	RESISTOR, C-F 2K
R103	420-2003	RESISTOR, VAR, 50K BALANCE
R105	420-2009	RESISTOR, VAR, 50K, DUAL VOLUME
R107, R108	434-5152	RESISTOR, C-F, 15K
R109, R110	434-4562	RESISTOR, C-F, 5.6K
R111, R112	434-4622	RESISTOR, C-F, 6.2K
R113 thru R118	420-2002	RESISTOR, VAR, 100K, TONE

* CAPACITOR P/N 381-XXXX ARE ELECTROLYTICS.

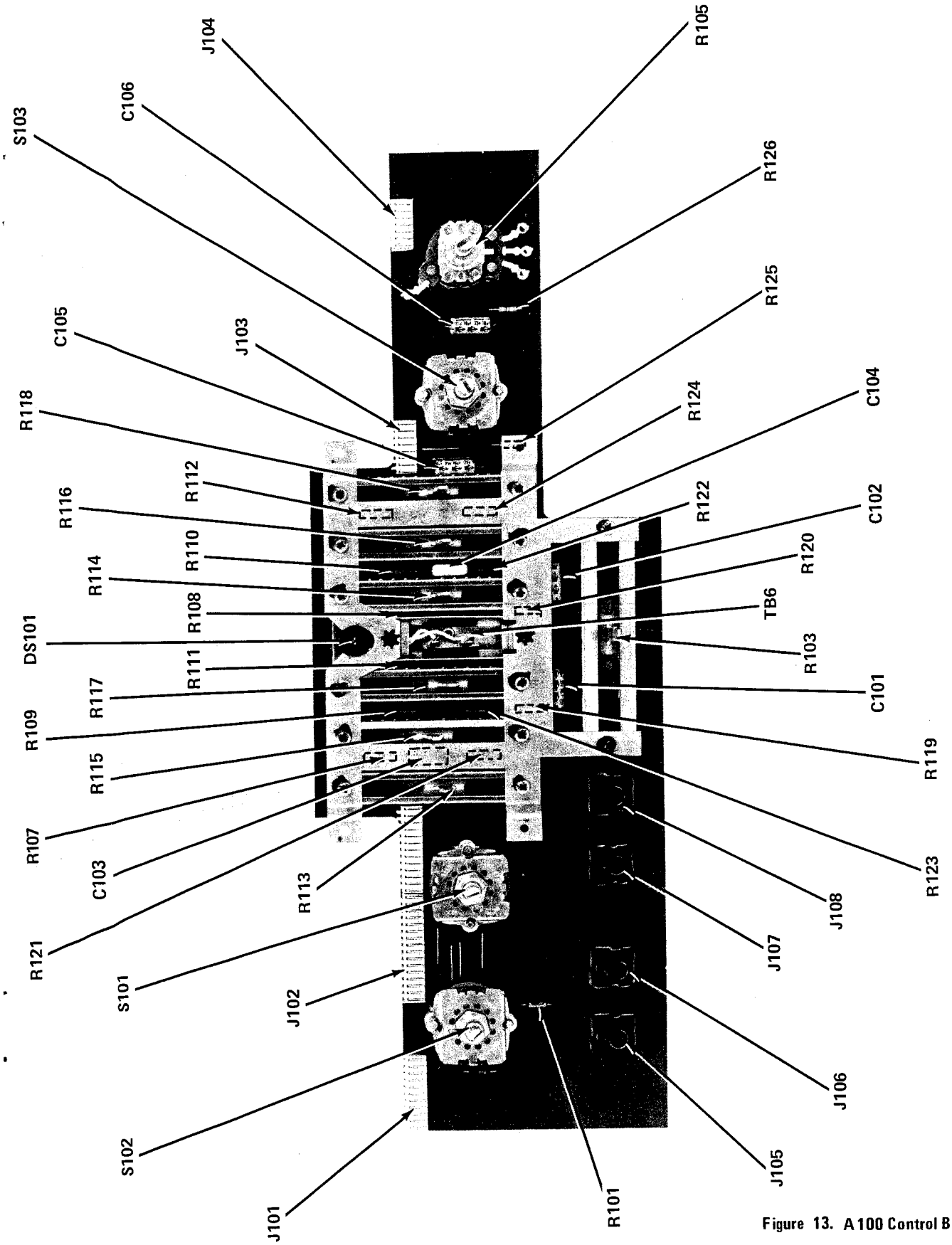


Figure 13. A100 Control Board

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
R119, R120	434-5152	RESISTOR, C-F, 15K
R121, R122	434-4562	RESISTOR, C-F, 5.6K
R123, R124	434-4682	RESISTOR, C-F, 6.8K
R125, R126	434-5472	RESISTOR, C-F, 47K
S101	453-2009	SWITCH, ROTARY, 3-POSN, TAPE MONITOR
S102	453-2008	SWITCH, ROTARY, 5-POSN, MODE
S103	453-2010	SWITCH, ROTARY, 2-POSN, TONE
	132-2000	BRACKET, VARIABLE RESISTOR
	168-1016-2	SPACER, BALANCE CONTROL
	168-2006	SPACER, TONE CONTROL
	566-1020	GROMMET
	673-0122	LOCKWASHER NO. 2, EXT. TOOTH x2
	701-0412	SCREW, 2-56 x 1/4 LG, PNH, CRSHD, STL, BLK, WAX x2
	769-2001	SCREW, 3.0MM x 6.0MM LG PNH x14
A200-300	**200-2001-1**	**PREAMPLIFIER BOARD COMPONENT ASSEMBLY**
		CAPACITORS ARE ± 10%, 100V UNLESS OTHERWISE SPECIFIED.
C201, C202	* 381-3001	CAPACITOR, 4.7 MFD + 100%, -20%, 25V
C203, C204	385-1065	CAPACITOR, 82PF
C205, C206	385-1037	CAPACITOR, 270PF
C207, C208	381-3003	CAPACITOR, 22 MFD + 100%, -20%, 25V

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
C209, C210	385-2004	CAPACITOR, 220PF
C211, C212	385-1040	CAPACITOR, 47PF
C213, C214	385-1091	CAPACITOR, 1000PF ± 5%, 100V
C215, C216	383-1002	CAPACITOR, .03MFD ± 20%, 100V
C217, C218	385-1057	CAPACITOR, 3600PF ± 5%, 100V
C219, C220	386-2003	CAPACITOR, 1MFD
C221, C222	383-1002	CAPACITOR, .03MFD ± 20%, 100V
C223 thru C226	381-3001	CAPACITOR, 4.7MFD + 100%, -20%, 25V
C227, C228	385-2002	CAPACITOR, 510PF ± 5%, 100V
C229, C230	385-1074	CAPACITOR, 68PF
C231, C232	381-3006	CAPACITOR, 100MFD + 100%, -20%, 6.3V
C233, C234	385-1046	CAPACITOR, 2000PF
C235, C236	385-1073	CAPACITOR, 130PF
C237, C238	383-2000	CAPACITOR, .001MFD, GMV 300V
C239	383-1002	CAPACITOR, .03MFD ± 20%, 100V
C240		NOT USED
C241	383-1002	CAPACITOR, .03MFD ± 20%, 100V
C242		NOT USED
C243, C244	385-2003	CAPACITOR, 620PF
C245, C246	381-2002	CAPACITOR, 10MFD + 100%, -20%, 25V

* **CAPACITOR P/N 381-XXXX ARE ELECTROLYTICS.**

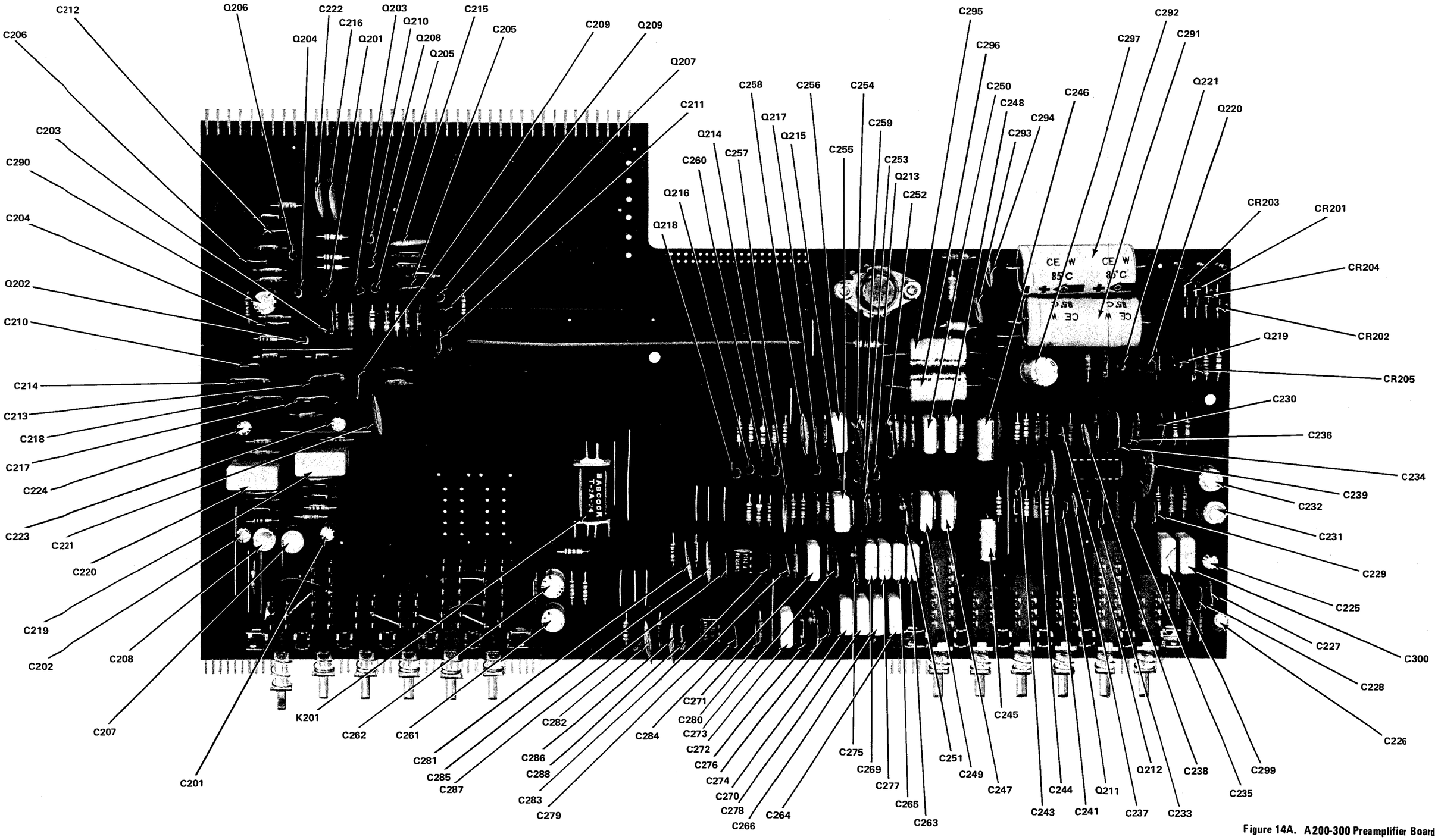


Figure 14A. A200-300 Preamplifier Board

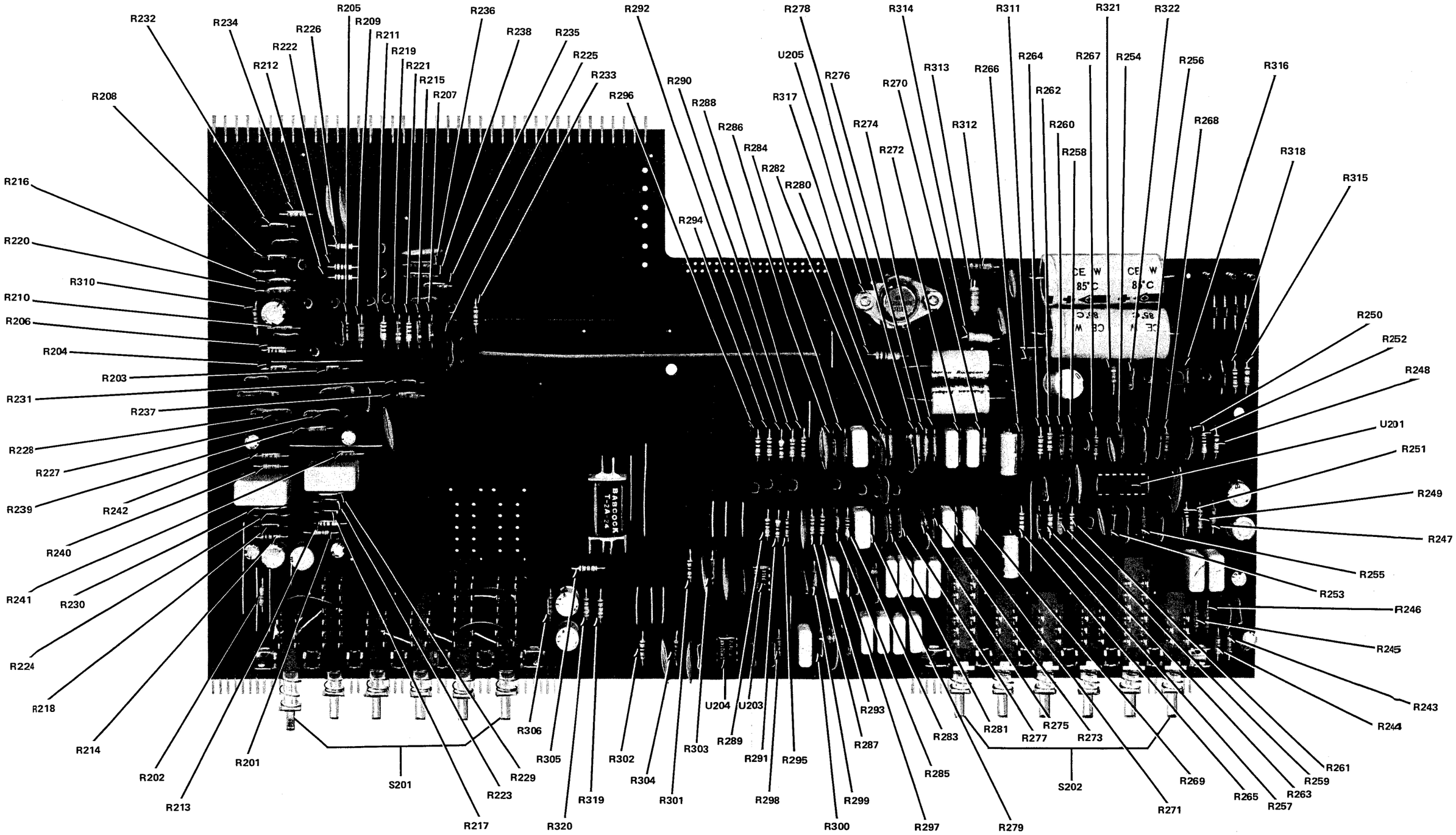


Figure 14B. A200-300 Preamplifier Board

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
C247 thru C250	386-2002	CAPACITOR, 0.1 MFD
C251, C252	385-1091	CAPACITOR, 1000PF ± 5%, 100V
C253, C254	385-2002	CAPACITOR, 510PF ± 5%, 100V
C255, C256	386-2005	CAPACITOR, 0.22 MFD
C257, C258	383-1002	CAPACITOR, .03MFD ± 20%, 100V
C259, C260	385-1040	CAPACITOR, 47PF
C261, C262	381-3003	CAPACITOR, 22MFD + 100%, -20%, 25V
C263, C264	386-2002	CAPACITOR, 0.1 MFD
C265, C266	386-2001	CAPACITOR, 0.027MFD
C267		NOT USED
C268		NOT USED
C269, C270	386-2001	CAPACITOR, 0.027MFD
C271, C272	386-2000	CAPACITOR, 5600PF
C273, C274	385-1087	CAPACITOR, 470PF
C275, C276	385-1094	CAPACITOR, 1500PF
C277, C278	386-2002	CAPACITOR, 0.1MFD
C279, C280	385-1035	CAPACITOR, 39PF ±10%, 500V
C281, C282	383-1002	CAPACITOR, .03MFD ±20%, 100V
C283, C284	385-2001	CAPACITOR, 56PF
C285, C286	383-1002	CAPACITOR, .03MFD ± 20%, 100V
C287, C288	385-1049	CAPACITOR, 5PF
C289		NOT USED
C290	381-3003	CAPACITOR, 22MFD + 100%, -20%, 25V

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
C291, C292	381-2001	CAPACITOR, 470MFD + 100%, -20%, 50V
C293, C294	383-2000	CAPACITOR, .001MFD, GMV, 300V
C295, C296	381-2000	CAPACITOR, 100MFD + 100%, -20%, 25V
C297	381-3007	CAPACITOR, 47MFD + 100%, -20%, 50V
C298		NOT USED
C299, C300	386-2004	CAPACITOR, 0.15MFD
CR201 thru CR204	460-2000	DIODE, RECTIFIER, 1N4003
CR205	460-1010	DIODE, RECTIFIER, 1N541
K201	410-2000	RELAY, REED, DPST (NO)
Q201 thru Q204	461-2001	TRANSISTOR, PNP, 2N4250
Q205, Q206	462-2000	TRANSISTOR, NPN, MPSA18
Q207, Q208	462-2018	TRANSISTOR, NPN, MPSH04
Q209, Q210	461-2001	TRANSISTOR, PNP, 2N4250
Q211 thru Q214	462-2002	TRANSISTOR, NPN, 2N5210
Q215, Q216	461-2001	TRANSISTOR, PNP, 2N4250
Q217, Q218	462-2002	TRANSISTOR, NPN, 2N5210
Q219	461-2001	TRANSISTOR, PNP, 2N4250
Q220	462-2004	TRANSISTOR, NPN, 2N5961
Q221	461-2001	TRANSISTOR, PNP, 2N4250

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
		RESISTORS ARE OHMS ± 5%, 1/4W UNLESS OTHERWISE SPECIFIED.
R201, R202	434-5472	RESISTOR, C-F, 47K
R203, R204	434-7332	RESISTOR, C-F, 3.3MEG
R205, R206	434-3512	RESISTOR, C-F, 510
R207, R208	439-2007-01	RESISTOR, M-F, 30K
R209, R210	439-2007-02	RESISTOR, M-F, 180K
R211, R212	434-4152	RESISTOR, C-F, 1.5K
R213, R214	434-3682	RESISTOR, C-F, 680
R215, R216	434-4332	RESISTOR, C-F, 3.3K
R217, R218	434-7222	RESISTOR, C-F, 2.2MEG
R219, R220	434-6682	RESISTOR, C-F, 680K
R221, R222	434-4152	RESISTOR, C-F, 1.5K
R223, R224	434-7222	RESISTOR, C-F, 2.2MEG
R225, R226	434-5152	RESISTOR, C-F, 15K
R227, R228	434-5912	RESISTOR' C-F, 91K
R229, R230	434-5752	RESISTOR, C-F, 75K
R231, R232	434-4202	RESISTOR, C-F, 2K
R233, R234	434-4272	RESISTOR, C-F, 2.7K
R235 thru R238	434-2222	RESISTOR, C-F, 22
R239, R240	434-5472	RESISTOR, C-F, 47K
R241, R242	434-3152	RESISTOR, C-F, 150
R243, R244	434-5122	RESISTOR, C-F, 12K

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
R245, R246	434-4272	RESISTOR, C-F, 2.7K
R247, R248	434-6182	RESISTOR, C-F, 180K
R249, R250	434-3512	RESISTOR, C-F, 510
R251, R252	434-4102	RESISTOR, C-F, 1K
R253- R254	434-2752	RESISTOR, C-F, 75
R255, R256	434-5102	RESISTOR, C-F, 10K
R257, R258	434-7102	RESISTOR, C-F, 1.0MEG
R259, R260	434-5562	RESISTOR, C-F, 56K
R261, R262	434-3152	RESISTOR, C-F, 150
R263, R264	434-3222	RESISTOR, C-F, 220
R265, R266	434-3152	RESISTOR, C-F, 150
R267, R268	434-2102	RESISTOR, C-F, 10
R269, R270	434-5472	RESISTOR, C-F, 47K
R271, R272	434-5362	RESISTOR, C-F, 36K
R273, R274	434-5752	RESISTOR, C-F, 75K
R275, R276	434-5432	RESISTOR, C-F, 43K
R277 thru R280	434-5562	RESISTOR, C-F, 56K
R281, R282	434-5432	RESISTOR, C-F, 43K
R283, R284	434-4102	RESISTOR, C-F, 1K
R285, R286	434-7332	RESISTOR, C-F, 3.3MEG
R287, R288	434-4752	RESISTOR, C-F, 7.5K
R289, R290	434-5222	RESISTOR, C-F, 22K

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE
R291, R292 R293 thru R296	434-3912	RESISTOR, C-F 910
	434-3102	RESISTOR, C-F, 100
R297, R298	434-5272	RESISTOR, C-F, 27K
R299, R300	434-5122	RESISTOR, C-F, 12K
R301 thru R304	434-2102	RESISTOR, C-F, 10
R305, R306	434-3152	RESISTOR, C-F, 150
R307		NOT USED
R308		NOT USED
R309		NOT USED
R310	434-5102	RESISTOR, C-F, 10K
R311		
R312	434-2222	RESISTOR, C-F, 22
R313	439-2000	RESISTOR, C-F, 71.5K ± 1%, 1/4 W
R314	434-5431	RESISTOR, C-F, 43K ± 2%, 1/4 W
R315	434-6102	RESISTOR, C-F, 100K
R316	434-4202	RESISTOR, C-F, 2K
R317	433-4102	RESISTOR, C-F, 1K ± 5%, 1/2 W
R318	434-3102	RESISTOR, C-F, 100
R319, R320	434-5122	RESISTOR, C-F, 12K
R321	434-5392	RESISTOR, C-F, 39K
R322	434-4332	RESISTOR, C-F, 3.3K
S201	452-2004	SWITCH, PUSHBUTTON, 6-STATION (SELECTOR)
S202	452-2005	SWITCH, PUSHBUTTON, 6-STATION (FILTERS)
U201	466-2000	INTEGRATED CIRCUIT, DUAL LINEAR OPERATIONAL AMPLIFIER
U202		NOT USED

REFERENCE DESIGNATION	MARANTZ PART NUMBER	NOMENCLATURE	
U203	466-2003	INTEGRATED CIRCUIT, LINEAR OPERATIONAL AMPLIFIER	
U204	466-2003	INTEGRATED CIRCUIT, LINEAR OPERATIONAL AMPLIFIER	
U205	470-2000	INTEGRATED CIRCUIT, POWER SUPPLY REGULATOR	
	360-1025	MALE CONNECTOR, F PIN, .100 SPACING	
	360-2005	MALE CONNECTOR, F PIN, .150 SPACING	
	368-2003	SOCKET, I.C., 14-PIN	
	368-2002	SOCKET, I.C., 8-PIN	
	562-2000	HEAT DISSIPATOR	
	671-4330	LOCKWASHER NO. 6, SPT, CD	
	680-4220	NUT, HEX, 6-32, CD	
	741-0610	SCREW, 6-32 x 3/8 L, PNH. CRSHD, STL, CD	
A400	**200-2010-1**	**JACK PANEL ASSEMBLY**	
J401 thru J420	360-1029	PHONO JACK	
J421	360-2004	10-PIN CONNECTOR, .150 SPACING	x4
	200-2008-1	JACK MOUNTING PANEL, COMPLETE ASSEMBLY	
	200-2005-1	JACK INPUT PANEL, COMPLETE ASSEMBLY	
	359-2002	STANDOFF, NO. 8-32 THD	
	359-2003	STANDOFF, NO. 6-32 THD	x4
		PACKING SET:	
	196-2000	INSERT, HALF	x2
	195-2000-12	CARTON INNER	
	195-2000-52	CARTON, OUTER	
	199-2002	SERVICE MANUAL	
	199-2004	SCHEMATIC DIAGRAM	

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